

pire. And perhaps the statesmen who have steadily pursued their policy in this respect when the cry for economy, even at the expense of efficiency, was rising round them, have their reward even now. A Minister of State who recently visited Europe, talking to an English friend of the future of his country, stated that in Japan they trusted to their system of popular education acting on the intelligence of their people to prevent the spread of revolutionary doctrines; the schoolmaster was abroad in the land, and its rulers could rest safe from that danger at least.

The Education Department in Japan is one of the ten principal offices of State, its head ranking as a first-class Minister. It has the usual staff of Vice-Ministers and Secretaries, who carry on the business, and from time to time visit and inspect the various districts. All the local governors are, in educational matters, directly under the control of the Minister. The salaries of professors range from about 1000*l.* per annum (foreigners probably) to 250*l.*, and those of teachers from 100*l.* to 30*l.* The latter are, we believe, considerably higher in proportion than those of Board-school teachers in this country. School text-books are chosen with great care, and by the Department itself; indeed almost all the books are compiled and published by the Government. In the capital two establishments have been organised in the interest of education—one a library where works in all languages are collected, and placed, under certain slight restrictions, at the disposal of the public; the other the educational museum, in which objects necessary to general education are collected for the benefit of those engaged in it. The rules by which all schools are governed, whether they are local, general, or private, appear ultimately to come under the notice of the Minister of Education for his approval, so that the administration is a highly centralised one. An important feature of the work is the number of students sent abroad by one or other of the Departments of State. The Education Department has sent fifty in the past seven years, and there are at present twenty-two abroad, of whom seventeen are in Germany, one in Austria, two in England, one in France, and one in America. All these are graduates of the Tokio University, who were specially selected by the Minister of Education for the purpose of being sent abroad. The great preponderance of these in Germany is remarkable, and would appear to show that the Japanese are inclined to discard English and American educational institutions (which have had their day in Japanese estimation) for those of Germany. On the other hand, it may be that those are mostly medical students, who have from the beginning been sent to German Universities. Before coming to the various classes of schools, the statistics had perhaps better be given. The following are for 1882, the details for 1883 not being yet forthcoming:—

| | Number | Professors and Teachers | Pupils |
|-----------------------|--------|----------------------------|-----------|
| Elementary schools... | 28,908 | 76,769 | 2,616,879 |
| High schools ... | 173 | 934 | 12,315 |
| Normal schools ... | 71 | 602 | 5,275 |
| Universities ... | 2 | 135 | 2,035 |
| Technical schools ... | 98 | 975 | 8,829 |
| Other schools ... | 1,026 | 2,598 | 72,260 |

Of the 2,616,879 pupils at the elementary schools, only 733,691 are girls. Nearly the whole of these schools are maintained by the various local Governments, *i.e.* out of local, not Imperial, taxes. The whole system is administered under a code first promulgated in 1872, re-issued in an improved shape in 1879, and again revised in 1881.

The lowest schools of all are the Kindergarten, where children under school age are taught for three years reading, writing, ciphering, embroidery, paper-plaiting, drawing, &c. The next grade is the elementary schools, where a general education is given, and at which attendance is compulsory. The district for such a school varies with

the population and resources; but theoretically, and as a rule in practice, one exists in every ward and in every village. The course of these schools is divided into lower, intermediate, and higher grades. The lower grade course comprises the elements of morals, reading, writing, arithmetic, singing, and gymnastics; the intermediate, besides these, includes geography, history, drawing, physics, and natural history; while the higher grade adds chemistry, geometry, physiology, and political economy. Teachers receive certificates either for a certain class of schools or for a special subject from the normal schools, or from the local inspectorates. Committees or Boards, similar apparently to our School-Boards, are formed in each district, but their functions are limited to seeing to the attendance of the children, and they seem to have no power over the finances of the school. The next grade of schools is the "middle schools," organised in each district according to the local conditions and demands. Their object is to give higher instruction in the ordinary branches of study, so as to prepare students for liberal pursuits or for the more advanced schools. In addition to the subjects already specified, we find the middle-school course including elementary mathematics, natural science, geology, Japanese law, and one European language. To provide a model for these schools, the Minister of Education established a middle school at Osaka, to which reference can be made. There is only one University, that of Tokio, with four departments, law, science, literature, and medicine. Nothing need be said of this, as it is organised in the usual way. There are two preparatory schools for it, and the department of science appears to be well equipped with astronomical and meteorological observatories, botanical gardens, and museums.

In addition to these, which may be called the ordinary educational institutions, there are special colleges attached, or under the control of certain Departments. Such are the Military Academy, the Engineering College, the Training Schools for the Navy and Army, the School of Marine Engineering, of Forestry, Law, Telegraphy, &c. The normal schools for the training of teachers should also be noticed. They are established in almost every district, and now number seventy-six. The Government has provided two model normal schools in Tokio, one for male teachers, the other for females, and it is worth noticing that the latter was opened by the Empress herself. There are two schools of agriculture, one near Tokio, the other at Sapporo in Yezo. In the former the students are instructed in the science of agriculture, in veterinary science and agricultural chemistry, while in the latter stock-rearing and cultivation are taught.

These appear to be the chief features of the Report, and it is much to be wished that the compilers had given some information regarding the part played by Europeans in Japanese education. A comparative statement of the number of Europeans employed in the Department or in local schools eight or ten years ago, and now how far the posts they occupied have been abolished, or occupied by Japanese found suitable for the work, would have been interesting.

BRITISH BIRDS AT THE NATURAL HISTORY MUSEUM

VISITORS to the new Natural History Museum can scarcely have failed to notice the many improvements which have been made in the re-arrangement of the zoological collections since their removal from Bloomsbury to South Kensington. Not only is there greater space now available for exhibiting the contents of each gallery, but a large proportion of new specimens have been introduced into the cases.

It is of course not to be expected that stuffed animals, however well preserved, will last for ever, and some of the

specimens in the national collection are considerably more than a hundred years old. A certain amount of "weeding out" from time to time is consequently unavoidable, and is by no means so easy a process as might be supposed. The preservation of "types," that is, of the original specimens from which the species were first described, has very properly been considered of great importance; they have been withdrawn from exhibition and exposure to light, and relegated to the study series; but old and badly-mounted specimens of no historical value have been discarded, and their places filled with recently-obtained fresh examples of the same species, preserved and mounted with all the skill which modern taxidermists have been able to bestow upon them.

The Osteological, Cetacean, and Coral Galleries contain collections which were but incompletely represented in the exhibition rooms of the old building, and in fact, offer to the visitor entirely new exhibitions, of which those who have been engaged in their formation and arrangement may well be proud. None of these, however, appeal by their direct instructiveness to the British public, or are appreciated by them so much as the series of groups of British birds illustrating their mode of nidification, which is placed on the right and left of the central hall.

Here the visitor finds a collection of British birds, in which each species is separately represented by a pair of old birds in the plumage peculiar to the breeding season, with its nest and eggs, not merely in a natural position, but in the actual position in which they were found; the arboreal birds being placed on the identical branches which they themselves selected for nidification, the ground breeders remaining on the actual patch of ground, whether grass-grown or heather-clad, in which they had designed to rear their young.

It is needless to enlarge upon the advantage to be derived from a lesson thus accurately imparted, or upon the excellent opportunity thus afforded for comparing the variation in structure of nests built by birds belonging to different orders and families. As an aid, also, to the identification of the owner of a nest unknown to the finder, the series is a useful one, and will become more so as the collection is extended, for the process of forming and preparing such a collection must be slow. It is nearly four years ago since Dr. Günther commenced its formation, and without the aid of ardent lovers of nature like Lord Lovat, Mr. T. Harcourt Powell, Mr. D. Parker, Colonel Irby, and especially Lord Walsingham, it would have been impossible for him to have made this series, as it is, one of the most instructive attractions of the Natural History Museum. As for ornithologists, it is difficult to say where the interest ceases.

Not very long since Mr. H. Seebohm gave a lecture at the Zoological Gardens on "Birds' Nests," and could he have pointed to these beautifully-mounted cases at South Kensington, he would have had the most appropriate illustrations possible to his discourse.

From an attentive study of the subject he considered that nests might be roughly grouped into five classes, according as the birds which owned them relied for the safety of their eggs: (1) on the concealed position of the nest; (2) upon the inaccessible position of the nest; (3) upon the protective colour of the eggs; (4) upon the protective colour of the sitting hen; (5) upon their own ability, either singly, in pairs, or in colonies to defend their eggs.

Illustrations of all these five classes (and Mr. Seebohm might have added a sixth, viz. contrivances employed for concealing the eggs on the bird leaving its nest) may be seen in the British Museum cases, and furnish as good a basis as any for studying the series.

Starting from the entrance to the Mammalia Gallery, and proceeding towards the staircase, we at once come upon several cases of birds which rely for the safety of

their eggs upon the concealed position of the nest. Here we find a pair of dippers with their nest of green moss most skilfully constructed and domed, placed just under a moss-grown stump overhanging the water. Patches of the same moss around and about the stump deceive the eye and render detection of the nest very difficult, unless the bird is seen to leave or enter it. A section of the nest, represented by an illustration, shows a curious feature in its construction. It is not only cup-shaped and domed, but the front edge of the cup curls over towards the centre of the nest, as if to protect the pure white eggs from any drip or spray from the stream in whose banks the nest is placed.

Close to this group we find two cases of woodpeckers, the green woodpecker or "yaffle" and the greater spotted woodpecker, both of which deposit their white eggs in the hole of a tree, the aperture of which as a rule is only just large enough to admit the bird, and consequently the nest, composed of dry chips and bits of bark, is well concealed. But the woodpeckers might, with almost equal propriety, be placed amongst those birds which rely for the safety of their eggs on the inaccessible position of their nest.

It has been stated that as a general rule all eggs which are deposited in holes or in well-roofed nests are white, and certainly we have illustrations of this in the case of the dipper, woodpecker, owl, kingfisher, swift, sandmartin, and other birds; but, on the other hand, the jackdaw, nuthatch, tree-creeper, and various kinds of titmouse, all breed in holes and yet lay coloured eggs; while the pigeons, doves, grebes, and waterfowl lay white eggs in open nests; so that no precise rule can be laid down on this head.

Almost all the small passerine birds may be said to rely for the safety of their eggs on the concealed position of the nest; hence it is difficult to name any without giving a long list of names. In the Natural History Museum series the following examples may be noted:—The yellowhammer, with its nest of dry grass placed in a clump of dead furze, whereby a contrast of colour is avoided which might lead to the detection of the nest; the meadow pipit, with its nest concealed in meadow grass; the reed bunting, with its nest placed low down, to escape observation, in a clump of rushes. Were this nest placed higher up in a plant of such open growth, it would be sure to attract attention. In like manner the linnet and Dartford warbler in furze, the skylark, yellow wagtail, and whinchat in meadow grass, all furnish illustrations of variety in the art of concealment as practised by the tiny architects.

Amongst birds which rely for safety on the inaccessible position of their nest may be mentioned the hawks and owls, raven, chough, kingfisher, sandmartin, moorhen, coot, and grebe. There are few eggs more difficult to take than those of the peregrine falcon, raven, and chough, from the habit of these birds to nest in precipitous cliffs; the kingfisher and sandmartin, breeding in holes which sometimes extend several feet into a bank, and often not in a direct line, evidently imagine themselves safe from molestation; while moorhens, coots, and grebes, making slovenly-constructed nests upon soft, treacherous ground, or amongst sedges, flags, and other water plants which are unapproachable without the aid of a boat, afford another instance of how the same object may be achieved by a different method. One cannot fail to note that the more slovenly the nest of these water-birds the more likely is it to escape detection, for, were it well shaped and neat in appearance, its very neatness amidst a mass of wind-strewn rushes or tangled growth of water-weeds would be sure to attract attention towards it.

To give instances of birds which rely for safety on the protective colour of their eggs, we might mention the nightjar, peewit, stonecurlew, snipe, woodcock, ringed

plover, oystercatcher, the various species of tern or sea-swallow, and, generally speaking, all those birds which habitually deposit their eggs upon the ground, with little or no vestige of a nest.

Only those who have sought for and found the eggs of the peewit, stonecurlew, ringed plover, and oystercatcher can have any true idea of the remarkable approximation in the colour of the eggs to the ground whereon they are laid, the two first-named resembling the small clods and stones upon the fallows where they are found, the two last-named counterfeiting the freckled, water-worn pebbles of the beach.

Many of the above-named species and others are

already represented in the Museum series. The group of the ring plover with the newly-hatched young hiding between, and scarcely distinguishable from the pebbles, is charming by its simplicity; whilst the bit of Scotch moor with the woodcock's nest will arrest the attention of every sportsman whose personal experience of this bird has been limited to a glimpse of it in the shooting season.

If we look around the collection for instances of species which rely for the safety of their eggs on the protective colour of the sitting hen, we shall find excellent illustrations in the case of the pheasant and grouse, two of the most life-like groups in the series. In the former



Grebes and Nest.

case we seem to have a little bit carved out, as it were, and carried away from an English wood in spring-time—primroses, bluebells, and all!

It is probable that in this same class we must include all the game birds, a large number of the passerine birds (excepting those in which, as in the tits, wagtails, pipits, larks, and some of the warblers, the sexes are alike in plumage), the woodcocks, snipe, and ducks. But of these, as will appear from our previous remarks, the passerine birds would as well rely for safety on the concealed position of the nest, and the woodcock and snipe, on the protective colour of their eggs.

In a notable essay entitled "A Theory of Birds' Nests," published some years ago, Mr. A. R. Wallace, amongst

other ingenious propositions, attempted to establish the rule that, in all cases where the hen bird is brightly coloured like the male (as in the kingfishers, woodpeckers, tits, &c.) nidification takes place either in a hole or in a roofed nest; while in cases where the sexes differ in plumage, and the hen bird is of a dull colour (as in the pheasants, for example), the nest is open and the sitting bird exposed to view.

This theory, though at first sight plausible, is really untenable; for the exceptions which may be brought forward in both classes are as numerous as the cases cited in support of it. On reflection it is apparent that jays, orioles, and pigeons (many tropical species of which are brilliantly coloured), according to Mr. Wallace, ought to

be found breeding in holes or in roofed nests, their eggs concealed from view; but, on the contrary, they build open nests, some of them, as with the pigeons, being very clumsy and conspicuous structures. On the other hand, birds like the creeper, nuthatch, wren, willow wren, and chiffchaff, with the hen birds of sombre colours, would be expected, on Mr. Wallace's theory, to build open cup-shaped nests wherein the sitting bird would be exposed to view; but the two first-named breed in holes of trees, and the others all construct domed nests. It would be easy to take exception to other propositions made by Mr. Wallace, and generally to combat his ingenious theory; but such is not our object here. We have referred to his essay rather for the purpose of redirecting attention to it in connection with the admirable series of birds' nests in the collection under notice which furnishes the reader with illustrations to many of Mr. Wallace's remarks.

As to the birds which rely for the safety of their eggs on their own ability to defend them, whether singly or in pairs or colonies, familiar examples occur to us in the partridge, peewit, and black-headed gull. There must be few observant naturalists who have walked abroad in the nesting time and have not witnessed and admired the extraordinary efforts made by some or all of these birds to decoy the intruder away from their eggs or young by feigning lameness, or to frighten him away from the spot by boldly dashing at his head with loud reiterated cries.

The group, of which an engraving is here given from a careful sketch by Mr. Charles Whymper, represents a pair of little grebes, or dabchicks as they are provincially called, at a pond-side, with their characteristic nest of weeds. The hen bird is just leaving the nest to join her mate, having hastily covered her white eggs to conceal them.

The taxidermist, it will be observed, in this case has been obliged to show them partially uncovered, in order to explain what otherwise might remain unsuspected by those who are unfamiliar with the habits of these interesting birds.

NOTES

THE Queen has been pleased to confer the dignity of a Knight of the United Kingdom on John William Dawson, LL.D., C.M.G., Principal and Vice-Chancellor of the McGill University, Montreal, in the Dominion of Canada.

THE death is announced of Dr. J. J. Woodward, surgeon, United States Army, the well-known microscopist, whose admirable photo-micrographs, produced during his official connection with the Army Medical Museum, Washington, have given the pre-eminence to America for this branch of scientific microscopy.

THE Electrical Conference at Philadelphia has adopted resolutions that steps should be taken to legalise in America the ohm adopted by the Paris Conference, as also the ampere and volt, as electrical standards of measure. It was proposed by Mr. W. H. Preece that the Committee should consider the adoption of the English watt as a unit of power; this was also adopted.

PROF. ROBERT S. BALL lectured in Philadelphia on Wednesday night last week on the distances of the stars. He had a large audience at the Academy of Music.

THE first aerial voyage in England having taken place from the Honourable Artillery Company's ground at Finsbury on September 15, 1784, in the presence of the Prince of Wales, afterwards George IV., preparations were made to fittingly celebrate the 100th anniversary of the event, which occurred on Monday. A committee successfully perfected the arrangements for the ascent of three huge balloons from the grounds at the

rear of the Finsbury Armoury, whence, at 5 minutes after 2 in the afternoon, just a century before, Lunardi, the secretary to the Neapolitan Ambassador in London, started upon the first aerial voyage performed in this country, and ultimately descended, at 20 minutes past 4, in safety in a meadow at Standon, near Ware, Hertfordshire. In the Long Room, Col. Beaumont, R.E., presiding, M. W. de Fonvielle, editor of *La Lumière Électrique*, delivered an address, in which he described the improvements made in the construction and the gear of balloons during the past century, particularly alluding to the improvements effected by the late Mr. Green, the inventor of the cone anchor, which had been the means of saving the lives of so many aeronauts when they drifted out to sea, and had been rescued by passing vessels. He spoke hopefully and sanguinely of the ultimate success of the efforts now being made by gallant French officers to steer balloons by the medium of electric currents.

A SECOND ascent was made on Friday at Meudon in Capt. Renard's new balloon, but this time without the success which attended the former experiment. There was a good breeze. On the previous occasion, it will be remembered, there was only a slight breeze. After resisting the wind and remaining stationary, or nearly so, for a few minutes, the balloon was carried in the direction of Versailles, and, on one of the batteries ceasing to work, descended near Versailles. From there the balloon had to be dragged back to Meudon. The inventors assert that, but for the accident to the battery, they would have returned to Meudon in the teeth of the wind.

M. REGNARD has made a series of experiments on living organisms under high pressures. Yeast was found to be latent after having been subjected to a pressure of 1000 atmospheres for one hour; an hour later it began to ferment in sweetened water. Starch was transformed to sugar by saliva at 1000 atmospheres. At 600 atmospheres *Algæ* were able to decompose carbonic acid in sunlight, but they died and began to putrefy after four days. Cress-seed after ten minutes' exposure to 1000 atmospheres were swollen with water, and after a week began to sprout. At 600 atmospheres Infusoria and mollusks, &c., were rendered morbid and latent, but when removed returned to their natural state. Fishes without bladders can stand 100 atmospheres, at 200 they seem asleep, at 300 they die, and at 400 they die and remain rigid even whilst putrefying.

WE observe that among the three recipients of the gold medals awarded by the University of Christiania is Prof. G. A. Guldberg.

A NEW enemy to the beetroot plantations has appeared in Scania (Sweden) in the shape of the spinach-fly (*Anthomyia spinarise*). It has previously been known as an enemy to spinach, but this year it has also attacked the beetroot plants. Dr. Holmgren believes that its appearance is only periodical.

ALTHOUGH a great deal has been done in Norway and Switzerland to examine and measure the glaciers in those countries, comparatively little has been done in Sweden in this respect. During the last couple of years, however, a glacialist, Dr. F. Svenonius, has been engaged in studying and measuring some of the glaciers in Norrland, and we now learn from the report of this gentleman that there are about a hundred glaciers in Sweden, but that they are very small, the whole covering altogether only nine square miles (Swedish). The area had previously been estimated at thirty square miles.

THE Corporation of Southampton have unanimously resolved to support the movement commenced by the Council of the Hartley Institution a short time ago, in favour of a revised Geological Survey of Hampshire and the Isle of Wight on the maps of the 6-inch scale. The Southampton Town Council will